



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT
APPEALS AND INTERFERENCES

Docket No. 14136

In Re The Application of)
ALLAN S. HODGSON et al.) Examiner: Mehrdad Dastouri
Serial No. 08/879,322) Art Unit 2723
Filed: June 20, 1997)
For: MEASUREMENT OF)
FRUIT PARTICLES)

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APPELLANTS' BRIEF

I. Introduction

Applicants and Appellants Allan S. Hodgson and Jessica M. Arnold appeal from the decision dated March 31, 1999, finally rejecting claims 1-10 and 12 of this application.

The present invention relates to improved apparatus and methods useful for measuring fruit particles in a matrix.¹ The invention finds great utility as a quality control test for fruit fillings and toppings used in yogurt and baked goods. These fruit fillings and toppings typically comprise fruit pieces in a sugar and/or starch or matrix blend.

¹ In the context of this application, fruit particles in a matrix are pieces of fruit in a sugar or starch based syrup such as used in yogurt or pastry fillings.

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The appearance and size of fruit pieces is an important attribute for consumer acceptance. Consumers prefer large and recognizable pieces of fruit. However, processing generally degrades the physical appearance of the fruit pieces and the pieces can lose their proper "fruit identity."

Prior art tests for "fruit identity" had wide variability and it was difficult to obtain consistent results. The present invention utilizes specially adapted equipment and methods including image analyzing software and provides consistent and reproducible results.

The claims have been rejected as obvious over a combination of references which applicants believe are improper because (1) the references are from divergent and unanalogous arts and no motivation or teaching (other than impermissible hindsight based on the rejected claims) existed for the combination relied on in the rejection and (2) the combination of references does not include all the elements of the invention.

II. Real Party In Interest

The real party in interest is Bunge Corporation, the assignee of the invention and of this application. The assignment from the

inventors to Bunge Corporation was recorded in the United States Patent and Trademark Office on October 20, 1997 at Reel 8765/Frame 0009.

III. Related Appeals And Interferences

To applicants', their legal representative's or their assignee's knowledge, there are no other appeals or interferences which will directly affect or be directly affected by or have a bearing on the decision in this appeal.

IV. Status of Claims

Claims 1-10 and 12 are pending in the application and are the claims on appeal. Appendix A contains a copy of the claims involved in the appeal.

Claim 11 was canceled, without prejudice, and claim 12 was substituted therefor in an Amendment and Response to Office Action dated February 10, 1999.

V. Status of Amendments

All amendments have been entered. No amendments were filed or sought subsequent to the final rejection.

VI. Summary of the Invention

The claims are directed to apparatus (Claims 1-10) and methods (Claim 12) for the measurement of fruit particles in a matrix. In the summary provided below, the elements of the claims are set forth and references are provided to the illustrative embodiment of the specification by page and line numbers and to the drawing by figure and reference numbers.

Claim 1 is directed to apparatus for the measurement of fruit particles in a matrix. See page 7, line 20 to page 8, line 12. The apparatus includes a substantially opaque cabinet. See page 5, line 20 to page 6, line 13 and Fig. 2, reference no. 30. There is a camera in the upper portion of the cabinet. See page 4, lines 7 to 14, and Fig. 1, reference no. 20. A light source is provided in the cabinet. See page 5, lines 9-19 and Fig. 1, reference nos. 12 (light box), 14 (light-transmitting, translucent screen) and 26 (incident light source in a rectangular frame). There is a sample tray. See page 6, lines 14-20 and Fig. 3, reference no. 36. And, the apparatus includes a computer with image analyzing software. See page 4, line 13 to page 5, line 8.

Claim 2 is dependent on claim 1. Claim 2 adds the additional limitation that the light source comprises a light box in

the lower portion of the cabinet. See page 5, lines 12-19 and Fig. 1, reference no. 12.

Claim 3 is dependent on claim 1. Claim 3 adds the further limitation that the light source comprises an incident light source within the cabinet. See page 5, lines 9-11 and Fig. 1, reference no. 26.

Claim 4 is dependent on claim 1. Claim 4 adds the further limitation that the light source comprises switches for adjusting the intensity of the light. See page 5, lines 12-14.

Claim 5 is dependent on claim 1. Claim 5 adds the further limitation that the light source comprises multiple, independently-adjustable, light-producing sources. See page 5, lines 15-19 and Fig. 1, reference nos. 12 (light box), 14 (light-transmitting, translucent screen) and 26 (incident light source in a rectangular frame).

Claim 6 is dependent on claim 1. Claim 6 adds the further limitation that the inside of the cabinet is non-reflecting. See page 6, lines 1-2.

Claim 7 is dependent on claim 1. Claim 7 adds the further limitation that the sample tray comprises a light-transmitting bottom. See page 6, lines 14-15.

Claim 8 is dependent on Claim 2 (which is dependent on claim 1). Claim 8 adds the limitation that the apparatus further comprises a light box cover. See page 6, line 21 to page 7, line 10 and Figs. 4A and 4B, reference no. 38.

Claim 9 is dependent on Claim 8 (which is dependent on Claim 2 which is dependent on Claim 1). Claim 9 adds a limitation that the apparatus further comprises a sample tray guide. See page 7, lines 11-15 and Figs. 4A and 4B, reference no. 40.

Claim 10 is an independent claim. Claim 10 is directed to apparatus for the measurement of fruit particles in a matrix. See, e.g., page 7, line 20 to page 8, line 12. It includes a substantially opaque cabinet (See page 5, line 20 to page 6, line 13 and Fig. 2, reference no. 30) with a non-reflecting surface. See page 6, lines 1-2. There is a camera in the upper portion of the cabinet. See page 4, lines 7-14 and Fig. 1, reference no. 20. A light box (See page 5, lines 12-19) is provided with light intensity adjusting switches. See page 5, lines 12-14. It also includes an incident light source. See page 5, lines 9-11 and Fig. 1, reference no. 26. There is a sample tray (see page 6, lines 14-20 and Fig. 3, reference no. 36) with a light-transmitting bottom. See page 6, lines 14-15. Finally, it includes a computer with image analyzing

software. See page 4, line 13-page 5, line 8.

Claim 12 is an independent process claim. Claim 12 is directed to a process for measurement of fruit particles in a matrix. See, generally, page 7, line 16 through page 9, line 9 and especially, page 7, lines 20-22. The fruit particles in a matrix are placed in a sample tray. See page 8, lines 4-12. The fruit particles and matrix are illuminated so that an image may be obtained in which the fruit particles are distinguishable from the background. See page 8, lines 13-20. A computer-readable image of at least a portion of the illuminated fruit particles and matrix is captured. See page 8, lines 21-22. The image is analyzed using a computer and an image analyzing software program to obtain information concerning the fruit particles. See page 8, line 22 to page 9, line 9.

VII. Issues

Applicant wishes to present the following issues for review:

(1) Whether or not one having ordinary skill in the art to which the subject matter of the invention pertains would be motivated to make the combination of references cited against the pending claims; and

(2) Whether or not the references cited against the pending claims were properly construed to contain the teachings attributed to them in the rejection; and

(3) Whether or not the differences between the subject matter sought to be patented and the cited prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains;

With regard to these issues, the combinations of references cited against the pending claims are:

(a) Claims 1, 3, 6 and 7 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,533,628 (Tao) in view of U.S. Patent No. 3,575,287 (Graveley) and U.S. Patent No. 4,692,024 (Bloss);

(b) Claims 2, 8 and 9 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,533,628 (Tao) in view of U.S. Patent No. 4,692,024 (Bloss), U.S. Patent No. 3,575,287 (Graveley) and U.S. Patent No. 5,212,637 (Saxena);

(c) Claims 4 and 5 were rejected under 35 U.S.C. § 103(a) over U.S. Patent No. 5,533,628 (Tao) in view of U.S.

Patent No. 4,692,024 (Bloss), U.S. Patent No. 3,575,287 (Graveley) and U.S. Patent No. 5,301,090 (Hed);

(d) Claim 10 was rejected under 35 U.S.C. § 103(a) over the combination of references cited against claims 1, 3, 4, 6 and 7;

(e) Claim 12 was rejected under 35 U.S.C. § 103(a) over the combination of references cited against claim 1.

VIII. Grouping of Claims

Claims 1 and 12 are rejected based upon the same art and the same arguments. These claims stand or fall together.

For each of the other claims, a different basis of rejection was provided and this Brief contains separate arguments as to why each of these claims ought to be allowed. Therefore, it is respectfully requested that the patentability of these claims be considered independently.

Nonetheless, claim 1 is the broadest claim. If the reasons why claim 1 should be allowed are accepted, all the claims in the application may be allowed.

IX. Argument

The cited prior art is from entirely unrelated and nonanalogous arts and no teaching or motivation exists for the combination of references used to reject the claims. The unrelated and nonanalogous nature of cited prior art is apparent from even a cursory examination:

1. U.S. Patent No. 5,533,628 (Tao), the principal cited reference, is entitled "Method and Apparatus for Sorting Objects by Color Including Stable Color Transformation." It relates to sorting objects such as pieces of fruit by color. The apparatus includes a camera and processor but, unlike the present invention, the method is a continuous process used for sorting whole and substantially round fruit, such as apples and oranges, by color.

2. U. S. Patent No. 4,692,024 (Bloss) is entitled "Automatic Refractometer." It relates to method and apparatus which measures the principal refractive index of an isotropic solid or liquid. It is designed for use by geologists to study thin sections of rocks and ceramic materials to estimate the relative volumetric proportions of minerals.

3. U.S. Patent No. 3,575,287 (Graveley) is entitled "Packaging Container for Meat Products and the Like." It is

directed to a "see-through" packaging tray so that a customer can see the undersurface.

4. U.S. Patent No. 5,212,637 (Saxena) is entitled "Method of Investigating Mammograms for Masses and Calcifications, and Apparatus for Practicing Such Method." It relates to method and apparatus for analyzing mammograms in order to investigate a human breast for malignancy.

5. U. S. Patent No. 5,301,090 (Hed) is entitled "Luminaire." It relates to a device with different colored light sources which can be selectively controlled to produce different colored light at remote luminaire.

As should be readily appreciated, the cited prior art relates to widely divergent arts. The prior art relied upon is not reasonably related to the inventor's field of endeavor or any other single field of endeavor and is not reasonably pertinent to the particular problem with which the inventors were involved. See In re Oetiker, 977 F.2d 1443, 1447, 24 USPQ2d 1443, 1445-46 (Fed. Cir. 1992). The rejection cites no teachings which would support combining these references in the way they are used in the rejection. The rejection improperly uses the invention as a template for selecting and combining unrelated teachings to cite against the

invention.

Even using this large number of unrelated references, not all the claimed elements of the invention can be found. The rejection purports to remedy this lack of necessary teachings from the prior art by reading things into the cited references which are not there and by relying on "Official Notice".² As shown in detail below, none of the inventions defined in the rejected claim is suggested by the art, the art does not disclose all the elements of any claim and the combinations of references used to reject the claims are incomplete and unwarranted.

Claims 1, 3, 6 and 7

Claims 1, 3, 6 and 7 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Tao (U.S. Patent No. 5,533,628) in view of Graveley (U.S. Patent No. 3,575,287) and Bloss (U.S. Patent No. 4,692,024). The references cited against the claims and relied upon in making the rejection do not disclose all the elements of the invention, were not properly combined and do not

² "The Patent Office has the initial duty of supplying the factual basis for its rejection. It may not, because it may doubt that the invention is patentable, resort to speculation, unfounded assumptions or hindsight reconstruction to supply deficiencies in its factual basis." In re Warner, 379 F.2d 1011, 1017, 154 USPQ 173, 178 (CCPA 1967), cert. denied, 389 U.S. 1057 (1968).

render the invention claimed obvious.

The principal reference relied upon in the rejection is U.S. Patent No. 5,533,628 (Tao). Tao does not disclose all the elements of any claim in the application. With specific regard to claim 1, Tao does not disclose apparatus for the measurement of fruit particles in a matrix. The apparatus and method of Tao relate to color sorting of distinct objects rotated and supported on a conveyor belt. To the extent Tao is related to fruit, it is directed to sorting of whole and substantially round fruit such as apples and oranges.

In the rejection, it is argued that Tao discloses a substantially opaque cabinet in Figure 1 and at column 7, lines 14-19. Figure 1 at 5 shows the outline of an open-ended rectangle. In the written description in column 7, the entire relevant disclosure of Tao merely says "color sorting apparatus 5." It is respectfully submitted that Tao does not clearly teach a substantially opaque cabinet.

It is admitted in the rejection that Tao does not disclose the sample tray of claim 1. Thus, with regard to claim 1, Tao does not disclose these elements of claim 1: "fruit particles in a matrix," "a substantially opaque cabinet" and "a sample tray."

In order to overcome one of these deficiencies in Tao, the rejection relies on U.S. Patent No. 4,692,024 (Bloss) for allegedly disclosing measurement of fruit particles in a matrix at column 3, lines 43-53. Bloss discloses a refractometer primarily used for determining the refractive index of thin sections of solids by geologists. Bloss does disclose an alternative use at column 3, lines 43-53, where it says:

The method and apparatus of the present invention, equipped with a sample holder that permits flow-through of liquids (and control or measurement of their temperature), has potential use for industries in the quality control of liquids that are used or produced therein. The computer associated with the method and apparatus of the present invention could convert the refractive index it measures to a digital display of the percent sugar or total dissolved solids in fruit syrups, beverage concentrates, jams, jellies, or juices from beets, sugar cane or citrus fruits.

This passage does not support the rejection. The measurement of refractive index to display the percent sugar or total dissolved solids in fruit syrups, beverage concentrates, jams, jellies or juices is not the measurement of "fruit particles in a matrix." Bloss in this passage is clearly only discussing the possible use of his apparatus for quality control of liquids. As Bloss does not disclose the measurement of fruit particles in a matrix and as no other reference

is cited which discloses this element of the claimed invention, the rejection should be reversed on this grounds alone.

Even if Bloss did have the disclosure attributed to it, the combination of Tao and Bloss is improper. Tao and Bloss disclose entirely different apparatus and methods from entirely different arts. Tao is directed to an automatic sorter of whole fruit by color. Bloss is directed to an automatic refractometer primarily for measuring thin rock samples for geology. The rejection cites no evidence and even fails to include any argument why Tao and Bloss can be combined to reject the claims of this application.

To overcome another deficiency in Tao, i.e., the lack of any disclosure relating to a sample tray, the rejection relies on U.S. Patent No. 3,575,287 (Graveley). Graveley does not disclose a sample tray. Graveley is directed to a "see-through" packaging container for meat. It is not concerned with computer imaging for analytical purposes or with measurement of fruit particles in a matrix. Graveley does not even mention any food by name other than meat. The only alleged support for incorporating this reference into Tao referred to in the rejection is a two sentence long passage from Graveley that says: "[I]t will be appreciated that the tray of my invention is usable with foodstuff other than meat.

Indeed, it can be used wherever there is a packaging problem requiring the characteristics and capabilities of the tray of this invention." This broad and indefinite statement in no way supports the combination of Tao with Graveley or the rejection of the claims of the present application.

Claim 3 is dependent on claim 1 and adds the additional limitation that the light source comprise an incident light source within the cabinet. The rejection relies on Tao as disclosing this feature. Therefore, the same arguments that were made with respect to claim 1 apply to claim 3.

Claim 6 is dependent on claim 1 and adds the additional limitation that the inside of the cabinet is non-reflecting. In the rejection, it is admitted that Tao, Graveley and Bloss do not disclose an apparatus for measurement of fruit particles in a matrix wherein the inside of the cabinet is non-reflecting. No prior art is cited as disclosing this feature. The rejection states in this regard: "It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide a cabinet with non-reflecting inside surface because it will minimize light scattering inside the cabinet and will prevent degrading of the image quality due to light scattering." There is absolutely no evidence supporting

this statement and it represents nothing other than speculation. With no prior art relating to this additional element, claim 6 includes four elements not found in the cited art: "fruit particles in a matrix"; "a substantially opaque cabinet"; "a sample tray" and "the inside of the cabinet is non-reflecting."

Claim 7 is dependent on claim 1 and adds the additional limitation that the sample tray comprises a light-transmitting bottom. The same combination of references (Tao, Bloss and Graveley) and additional unsupported allegations as to what would be obvious were cited against claim 7. It is admitted in the rejection that neither Tao nor Bloss disclose an apparatus for measurement of the fruit particles in a matrix wherein the sample tray comprises a light-transmitting bottom. With regard to this limitation, the rejection says: "Graveley discloses a sample tray with light transmitting bottom utilized as a container for food products (Fig. 1; Column 2, lines 3-24)." As discussed above, there is no dispute that Graveley discloses a packaging container for meat with a "see-through" or light-transmitting bottom. But Graveley does not disclose a sample tray. The rejection further says with respect to claim 7: "It would have been obvious to a person of ordinary skill in the art at the time the invention was

made to provide a light transmitting (transparent) tray as a part of an apparatus for measurement of the fruit particles in a matrix because it will have the property of transmitting light so that objects lying on the tray are seen clearly, and their image are intelligently obtained when subjected to the incident light of the bottom mounted light box." There is no support for this statement and it constitutes speculation.

Claims 2, 8 and 9

Claims 2, 8 and 9 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Tao (U.S. Patent No. 5,533,628) in view of Bloss (U.S. Patent No. 4,692,024), Graveley (U.S. Patent No. 3,757,287) and Saxena (U.S. Patent No. 5,212,637).

Claim 2 is dependent on claim 1 and adds the additional limitation that the light source comprises a light box in the lower portion of the cabinet. Tao, Graveley and Bloss are applied against this claim in the same manner as these references were applied against Claim 1. Therefore, the same arguments as to why the rejection of Claim 1 was improper apply to Claim 2.

It is admitted in the rejection that Tao, Graveley and Bloss do not disclose an apparatus for measurement of fruit particles in a matrix with a light source comprising a light box in the lower

portion of the cabinet. The rejection relies on U.S. Patent No. 5,212,637 (Saxena) for disclosing this element. Saxena is directed to methods for analyzing mammograms to investigate a human breast for a malignancy. The rejection cites no evidence and fails to include any argument why the teachings of Saxena can be combined in this manner with the teachings of Tao, Bloss and Graveley. The combined references are from very different arts and no suggestion for this combination has been shown to exist.

Claim 8 is dependent on Claim 2 and adds the further limitation that the apparatus includes a light box cover. It is admitted that the combination of references relied on in rejecting Claim 2 (Tao, Bloss, Graveley and Saxena) does not include a light box cover. No prior art is cited as disclosing this feature. Instead, "Official Notice" is taken that "[t]he cover for an internal component such as a light box is considered one of the basic elements in composite modular structure of the cabinets, and has been frequently installed in electrical distribution boards." This argument is not a good substitute for evidence of obviousness. In the context of this invention which involves a semi-fluid food product, the claimed cover is an important element. Additionally, all the reasons for reversing the rejection of Claims 1 and 2 apply

to Claim 8.

Claim 9 is dependent on Claim 8 and includes the further limitation that the apparatus includes a sample tray guide. It is admitted that the combination of references relied on (Tao, Bloss, Graveley and Saxena) does not include a disclosure of this element either and again no prior art is cited as disclosing this feature. With regard to this claim, "Official Notice" is taken that "[a] cover with guides for installation of another component like a tray is considered one of the normal elements in composite modular structure of the cabinets, and has been frequently installed in electrical distribution boards." This is an improper basis for reading this important feature into the combination of prior art references. Of course, all the reasons given above as to why Claims 1, 2 and 8 are patentable apply to Claim 9.

Claims 4 and 5

Claims 4 and 5 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Tao (U.S. Patent No. 5,533,628) in view of Bloss (U.S. Patent No. 4,692,024), Graveley (U.S. Patent No. 3,575,287 and Hed (U.S. Patent No. 5,301,090).

Claim 4 is dependent from Claim 1 and adds the further limitation that the light source comprises switches for adjusting the

intensity of the light. It is conceded in the rejection that Tao, Bloss and Graveley do not disclose a light source comprising switches for adjusting the intensity of the light. Hed is relied upon for disclosing this feature. Hed is entitled "Luminaire" and relates to a device with different colored light sources which can be selectively controlled to produce different colored light at a remote luminaire. Hed does not in any way relate to fruit measurement or to systems for analyzing images. The rejection does not identify any suggestion for combining the cited art in the manner it is combined in making the rejection. Also, again, all the reasons discussed above with regard to why Tao, Bloss and Graveley do not render the invention of Claim 1 obvious apply to Claim 4.

Claim 5 is dependent on Claim 1 and adds the further limitation that the light source comprises multiple, independently-adjustable, light-producing sources. It is conceded in the rejection that Tao, Bloss and Graveley do not disclose a light source with multiple, independently-adjustable, light-producing sources. In the rejection, Hed is relied upon again for disclosing this element. Therefore, the arguments set forth above both with regard to combining disclosures of these unanalogous references and the failure to disclose all the elements of claim 1 apply to Claim 5.

Claim 10

Claim 10 is an independent claim which incorporates the elements of Claims 1, 3, 4, 6 and 7. The rejection says: "With regards to Claim 10, arguments analogous to those presented for Claims 1, 3, 4, 6 and 7 are applicable to Claim 10." Therefore, the arguments presented above with regard to Claims 1, 3, 4, 6 and 7 are relied upon with regard to Claim 10.

Claim 12

Claim 12 is an independent process claim. The rejection says: "With regards to Claim 12, arguments analogous to those presented for Claim 1 are applicable to Claim 12." Therefore, the arguments presented above with regard to Claim 1 are relied upon with regard to Claim 12.

X. Conclusion

The rejection of the claims in this application shall not be sustained. It is based on a combination of nonanalogous art combined in a manner that is not suggested in the art. Even so, the art still fails to include all the elements of any claim. Under these circumstances, it is clear that the invention as a whole is not obvious in light of the cited art.

Respectfully submitted,

Date: 10/12/99

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Terrence W. McMillin
REGISTERED ATTORNEY FOR
APPLICANT

October 12, 1999
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APPENDIX "A"

1. Apparatus for the measurement of fruit particles in a matrix comprising:
 - a substantially opaque cabinet;
 - a camera in the upper portion of said cabinet;
 - a light source in said cabinet;
 - a sample tray; and
 - a computer with image analyzing software.
2. The apparatus of claim 1 wherein said light source comprises a light box in the lower portion of said cabinet.
3. The apparatus of claim 1 wherein said light source comprises an incident light source within said cabinet.
4. The apparatus of claim 1 wherein the light source comprises switches for adjusting the intensity of the light.
5. The apparatus of claim 1 wherein the light source comprises multiple, independently-adjustable, light-producing

sources.

6. The apparatus of claim 1 wherein the inside of the cabinet is non-reflecting.

7. The apparatus of claim 1 wherein said sample tray comprises a light-transmitting bottom.

8. The apparatus of claim 2 wherein said apparatus further comprises a light box cover.

9. The apparatus of claim 8 wherein said apparatus further comprises a sample tray guide.

10. Apparatus for the measurement of fruit particles in a matrix comprising:

a substantially opaque cabinet with a non-reflecting inside surface;

a camera in the upper portion of said cabinet;

a light box with light intensity adjusting switches;

an incident light source;

a sample tray with a light-transmitting bottom; and
a computer with image analyzing software.

12. A process for the measurement of fruit particles in a matrix comprising:

placing in a sample tray fruit particles in a matrix;

illuminating said fruit particles and matrix so that an image may be obtained in which the fruit particles are distinguishable from the background;

capturing a computer-readable image of at least a portion of said illuminated fruit particles and matrix; and

using a computer and an image analyzing software program to analyze said image and obtain information concerning said fruit particles.